

EAST - [dual lathe.wsp:1]

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- L1: (8) "4665607"
- L2: (333255) laser\$1
- L3: (4) 1 and 2
- L4: (136) 72/4.ccls.
- L5: (78814) 72/\$.ccls.
- L6: (623) 2 and 5
- L7: (73) aral-takejl.in.

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- (0) tool near2 (machine or head or spindle\$1)
- (0) (two or dual) near3 (spindle\$1 or driver\$1 or chuck\$1)

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	U	I	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	WO 9009863 A1	19900907	15	METHOD OF WELDING MOTOR STATOR		219/121.64
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	EP 454861 A1	19911106	6	LASER WELDING METHOD FOR ZINC-PLATED STEEL SHEET.		
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JP 55146265 A	19801114		METHOD OF ADJUSTING FUEL INJECTION PUMP		123/459 ; 123/506
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JP 63098160 A	19880428		LASER		372/61
5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JP 63098161 A	19880428		LASER		372/109
6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JP 63098165 A	19880428		LASER		372/55
7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JP 63098166 A	19880428		LASER		372/92
8			JP 63273585 A	19881110		POWER CONTROL SYSTEM FOR CNC		

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	Document	Issue	Pa	Title	Curran	Current	Inventor	
1	US 5920973	199907	17	Hole forming system with multiple spindl	29/26A	408/43	Kosmowski, R	<input checked="" type="checkbox"/>
2	US 5640752	199706	36	Controlled adjustable manufacturing meth	29/596	29/564	Steiner, R	<input checked="" type="checkbox"/>
3	US 4752352	198806	21	Apparatus and method for forming an inte	216/33	156/154	Feygin, Mi	<input checked="" type="checkbox"/>
4	US 3766815	197310	10	APPARATUS FOR FORMING STRIP	83/160	29/24.5	Edixhoven,	<input checked="" type="checkbox"/>
5	US 6104598	200008	6	Free form capacitor	361/30	29/25.4	Duva, Fran	<input type="checkbox"/>
6	US 5870120	199902	14	Ink jet head base body, ink jet head usi	347/56	29/513	Teral, Har	<input type="checkbox"/>
7	US 5845379	199812	17	Method for making a supporting crossbar	29/6.1	29/897	Steffensen	<input type="checkbox"/>
8	US 5604971	199702	35	manufacturing method for variable lamina	29/596	29/598	Steiner, R	<input type="checkbox"/>
9	US 5559543	199609	27	Method of making uniformly printing ink	347/62	216/16	Komuro, Hi	<input type="checkbox"/>
10	US 5479980	199601	12	Method and device for forming drilled ne	163/5	163/1	Spingler,	<input type="checkbox"/>
11	US 5384945	199501	12	Device for forming drilled needle blanks	29/33R	163/1	Spingler,	<input type="checkbox"/>
12	US 5351377	199410	8	Workstock forming apparatus and method	29/38C	29/563	Gates, Jer	<input type="checkbox"/>
13	US 5271140	199312	41	Index-feed machining system	29/33R	29/33Q	Futamura,	<input type="checkbox"/>
14	US 5205036	199304	9	Method of manufacturing a semiconductor	29/856	29/827	Yamazaki,	<input type="checkbox"/>
15	US 5050650	199109	22	Axial lead electrical component feeder	140/10	29/566	Holcomb, G	<input type="checkbox"/>
16	US 4934035	199006	15	Method for producing friction bearing pa	29/898	29/898	Aubele, Ed	<input type="checkbox"/>
17	US 4932116	199006	15	Machine for producing friction bearing p	29/564	29/558	Aubele, Ed	<input type="checkbox"/>
18	US 4869865	198909	12	Method of manufacturing nuclear fuel bun	376/26	29/430	White, Dav	<input type="checkbox"/>
19	US RE32830	198901	7	Method of forming a precision ball track	29/898	29/558	Hazebrook,	<input type="checkbox"/>
20	US 4679295	198707	8	Modular machine tool for series machinin	29/564	226/120	Lopez, Ang	<input type="checkbox"/>
21	US 4672729	198706	10	Method for machining clutch gear for aut	29/893	72/332	Hoguchi, T	<input type="checkbox"/>
22	US 4655652	198704	20	Method of multiple station drilling	409/13	29/26A	Schissler,	<input type="checkbox"/>
23	US 4611373	198609	7	Method of forming a precision ball track	29/898	29/558	Hazebrook,	<input type="checkbox"/>
24	US 4551912	198511	7	Highly integrated universal tape bonding	29/827	228/170	Marks, Rob	<input type="checkbox"/>
25	US 4454645	198406	20	Multiple station drilling apparatus	29/563	29/564	Schissler,	<input type="checkbox"/>
26	US 4378631	198304	6	Method of fabricating a charge plate for	29/825	29/592	Head, Dona	<input type="checkbox"/>

Related U.S. Application Data

[63] Continuation of Ser. No. 412,532, Nov. 3, 1975,
abandoned.

[52] U.S. Cl. 198/19; 72/184;
83/295; 198/40; 214/1 BB; 219/125 R;

[51] Int. Cl.² H23Q 7/03
[58] Field of Search 198/19, 40, 53/295;

72/31, 184; 214/1 PE, 1 CM, 1 BB, 1 BT;
408/32; 318/39; 219/79, 80, 124, 125 R

[56] **References Cited**
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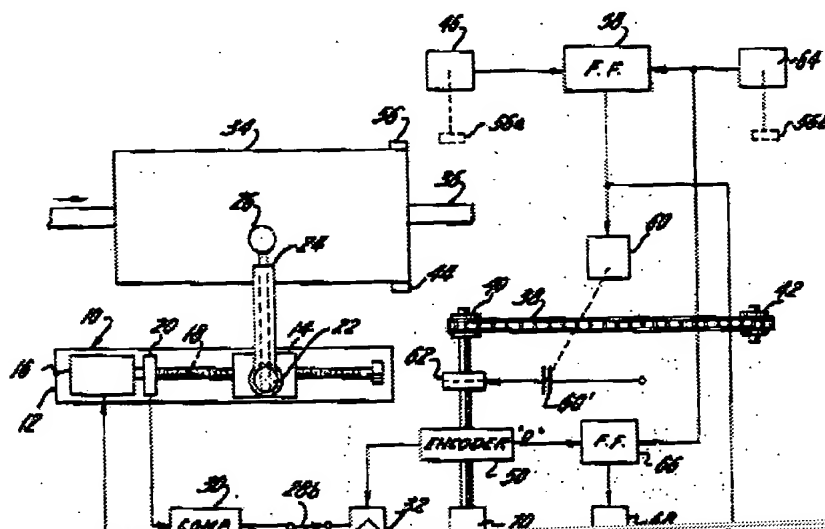
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3,665,143	3/1972	Yasenchak et al.	219/125 R
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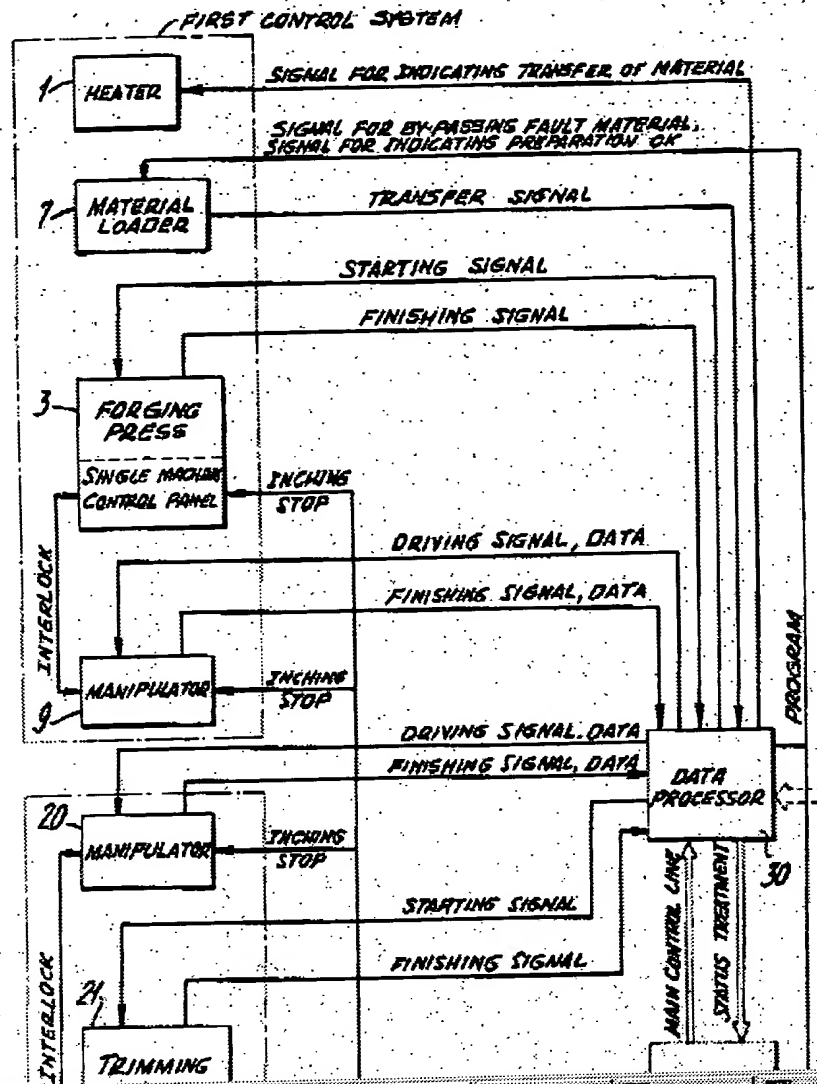
Primary Examiner—Evan C. Blunk
Assistant Examiner—Joseph E. Valenza

[57] ABSTRACT

An endless chain is caused to become locked to and driven by a work-carrier forming part of a conveyor. The chain drives a signal generator whose output represents the advance of the work-carrier past a robot and the generated signal is combined with program control signals of the robot to modify the operation of the robot so that the robot can operate on a moving work-piece whereas the robot's program alone would cause robot operations on a work-piece that remains at-rest.

18 Claims, & Drawing Figures





	Document I	Issue	Pa	Title	Current	Current	Inventor	
1	US 6073551	200006	8	Press having a transfer device for workp	100/20	198/621	Dangelmayr	<input type="checkbox"/>
2	US 5737960	199804	11	Press with a combination transfer system	72/405	72/405.	Brandstett	<input type="checkbox"/>
3	US 5582063	199612	8	Multistand press or similar press facili	72/455	72/405.	Hofele, Ha	<input type="checkbox"/>
4	US 5359872	199411	30	Method and apparatus for sheet-metal pro	72/16.	219/121	Nashiki, M	<input type="checkbox"/>
5	US 5271140	199312	41	Index-feed machining system	29/33K	29/33Q	Futamura,	<input type="checkbox"/>
6	US 4932116	199006	15	Machine for producing friction bearing p	29/564	29/558	Aubele, Ed	<input type="checkbox"/>
7	US 4672729	198706	10	Method for machining clutch gear for aut	29/893	72/332	Hoguchi, T	<input type="checkbox"/>
8	US 4554814	198511	15	Air transfer system and method for a she	70/345	72/349	Grow, Arth	<input type="checkbox"/>
9	US 4463587	198408	9	Article handling assembly for forging pr	72/4	198/495	Werner, Eb	<input type="checkbox"/>
10	US 4247033	198101	11	Method of and device for producing multi	228/10	219/62	Dahmen, Ka	<input type="checkbox"/>
11	US 3858422	197501	7	JET MOLDING DEVICE	72/56	425/522	Tominaga,	<input type="checkbox"/>
12	US 3837205	197409	5	PROCESS FOR COLD FORMING A METAL TUBE WI	72/260	72/370.	Simon, Jos	<input type="checkbox"/>
13	US 5363683	199411	7	Forming machine	72/405		Thudium, K	<input checked="" type="checkbox"/>
14	US 4934035	199006	15	Method for producing friction bearing pa	29/898	29/898.	Aubele, Ed	<input checked="" type="checkbox"/>

[21] Appl. No. Thomas G. Wolfe, Kane, both of Pa.
 [22] Filed 784,754
 [45] Patented Dec. 18, 1958
 [73] Assignee Ernest N. Calhoun
 Pittsburgh, Pa.

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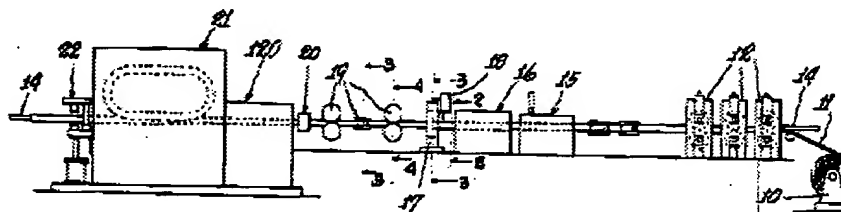
Primary Examiner—Richard J. Herbst
 Attorney—Williams and Kreake

[54] APPARATUS FOR MAKING TUBING
 8 Claims, 16 Drawing Figs.

[52] U.S. Cl. 72/289,
 72/283, 72/370, 29/477.7, 219/59
 [51] Int. Cl. B21b 17/10
 [50] Field of Search 219/59;
 228/18, 47, 56.3; 72/181, 283, 370, 208, 209;
 29/477.7

[56] References Cited
 UNITED STATES PATENTS
 1,120,209 12/1914 Lloyd 219/59

ABSTRACT: A tube mill wherein skelp is formed to tube shape and welded along a longitudinal split. The tubing is cold-worked at several passes in a manner that the coarse grain structure at the weld area is refined without affecting the surfaces of reducing dies. Means are provided to effect reciprocation of the mandrel during cold-working operations. The invention comprises methods of forming and working tubing and includes the forming of a tube from skelp having thickened longitudinal portions and cold-working the welded area to refine the weld structure approximately to that of the remaining tube.



	Document I	Issue	Pa	Title	Current	Current	Inventor	
1	US 6037575	200003	48	Method and apparatus for removing a defe	219/60	72/203	Isoyama, S	<input checked="" type="checkbox"/>
2	US 4583675	198604	5	Method of production of a part formed wi	228/15	219/91.	Ochiai, Iz	<input checked="" type="checkbox"/>
3	US 4310740	198201	6	Process for producing large-sized rectan	219/61	219/59.	Nakazima,	<input checked="" type="checkbox"/>
4	US 3958682	197605	8	Coordination of robot and conveyor	198/34	219/125	Martin, Pa	<input checked="" type="checkbox"/>
5	US 3831425	197408	7	FULLY AUTOMATIC FORGING PRESS	72/405	219/602	Kita, Masa	<input checked="" type="checkbox"/>
6	US 3718803	197302	13	APPARATUS AND METHOD FOR FABRICATING A C	219/15	219/161	Evans, Wil	<input checked="" type="checkbox"/>
7	US 3590622	197107	7	APPARATUS FOR MAKING TUBING	72/209	219/61.	Elge, Fran	<input checked="" type="checkbox"/>
8	US 6097012	200008	11	Induction-heating bender	219/60	219/635	Shiozuka,	<input type="checkbox"/>
9	US 6008481	199912	24	Method and apparatus for deciding heated	219/64	148/688	Mizoue, Ki	<input type="checkbox"/>
10	US 6002118	199912	58	Automatic plate bending system using hig	219/60	72/342.	Kawano, Ta	<input type="checkbox"/>
11	US 5990464	199911	15	Method for producing hot rolled steel sh	219/60	219/645	Hino, Yosh	<input type="checkbox"/>
12	US 5981921	199911	20	Method of magnetic pulse welding an end	219/60	219/611	Yablochnik	<input type="checkbox"/>
13	US 5973292	199910	5	Flared nozzle for welding gun and device	219/13	219/136	Igl, Adria	<input type="checkbox"/>
14	US 5966975	199910	5	Method and device for zinc plating a spa	72/46	219/69.	Lacourcell	<input type="checkbox"/>
15	US 5951903	199909	94	Method and apparatus for joining metal p	219/60	219/617	Isoyama, S	<input type="checkbox"/>
16	US 5948293	199909	16	Laser shock peening quality assurance by	219/12	72/53	Somers, Ra	<input type="checkbox"/>
17	US 5927129	199907	4	Apparatus and process for making cut ext	72/268	219/121	Thoms, Vol	<input type="checkbox"/>
18	US 5929765	199907	12	Method and apparatus for positioning and	340/67	219/121	Urech, Wer	<input type="checkbox"/>
19	US 5918501	199907	15	Sheet metal drawing tool and method for	72/479	219/86.	Sunaga, Hi	<input type="checkbox"/>
20	US 5910185	199906	11	Device for the guidance of hot-rolled st	72/202	219/653	Figge, Die	<input type="checkbox"/>
21	US 5906759	199905	37	Stent forming apparatus with stent defor	219/12	219/121	Richter, J	<input type="checkbox"/>
22	US 5872348	199902	10	Method for forming a projection for proj	219/93	219/117	Watanabe,	<input type="checkbox"/>
23	US 5824998	199810	16	Joining or welding of metal objects by a	219/61	219/603	Livshiz, Y	<input type="checkbox"/>
24	US 5753894	199805	49	Hot rolling method for continuously join	219/60	219/603	Isoyama, S	<input type="checkbox"/>
25	US 5744773	199804	13	Resistance heating process and apparatus	219/50	219/156	Van Ottere	<input type="checkbox"/>
26	US 5737957	199804	17	Apparatus for straightening a cylindrica	72/342	219/121	Gray, Stan	<input type="checkbox"/>

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(a) Patent Number: 5,371,140

Prigogine et al.

145 Date of Patent: Dec. 21, 1993

1.4.1 INDEXED FIELD MACHINING SYSTEM

[72] Assignee: Institute of Technology Prefecture
Electrical Engineering Works,
Kanagawa, Japan

FD-11 Appl. No. 67-603

[22] Fund: May 5, 1991

Foreign Application Priority Data

May 11, 1990	Japan	2-121750
May 11, 1990	Japan	2-121751
May 11, 1990	Japan	2-121752
May 11, 1990	Japan	2-121753

IN IN. CO. _____ RMD 1/08 BHP JCA
U.S. CL. _____ 19/03 BY 17/03 Q
ON 06-11-06 11:13 AM 10/04 11/04 12/04

(13) Field of Search: 25/33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862,

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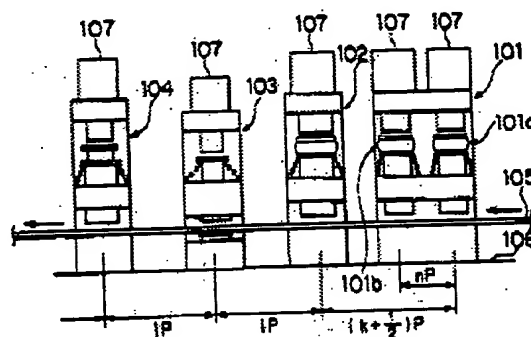
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187000 12/1975 United Kingdom ----- 71/04

Library Director—L. A. Binkley
Assistant—James C. Allen—McClure and Tindle

ABSTRACT

An independent machining system having a pilot machining device for expeditiously finishing pilot portions on a workpiece intended for precision machining. The pilot portions of the workpiece are guided by the pilot portions, and a plurality of independent machining means corresponding to a plurality of machining portions, all of these means being conveniently disposed in the feeding direction of workpieces, in which the pilot machining means and the pilot guide means are constructed integrally. The independent machining system lends itself to the easy positioning of machining means, and to the manufacture of high-precision products.

12 Clashes, 20 Drawing Sheets



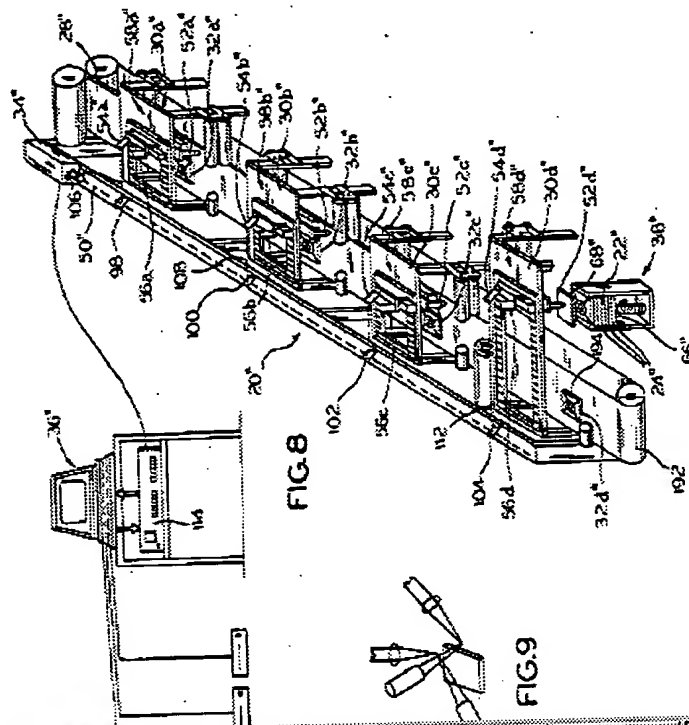


FIG. 8

FIG. 9

	Document	S	Issue	Pa	Title	Current 0	Current	Inventor	
1	EP 639425	D	199703	5	Laser welding component in metal plate hole - using p			GUHBERT, H	<input type="checkbox"/>
2	EP 593894	D	199807	11	Punching press with laser welding system - has positi			HELLWIG, W	<input type="checkbox"/>
3	EP 343661	D	199803	7	Welded stalls of punchings - made by applying laser b			HELLWIG, W	<input type="checkbox"/>

	Document	I	S	Issu	Pa	Title	Current 0	Current	Inventor	
1	US 5210910	E	199305	8		Bundling strap employing flat blank with one end havi			HELLWIG, J	<input type="checkbox"/>
2	US 4146848	E	197903			TITLE DATA NOT AVAILABLE			HELLWIG, H	<input type="checkbox"/>
3	US 3693008	E	197209			MOLECULAR FREQUENCY STANDARD			HELLWIG, H	<input type="checkbox"/>
4	US 3668293	E	197206			MOLECULAR FREQUENCY STANDARD			HELLWIG, H	<input type="checkbox"/>
5	EP 1037229	D	200009			Switch for motor vehicle lift-and-slide roof has oper			GEPPERT, H	<input type="checkbox"/>
6	CH 687009	D	199608			Welding coated stamped sections - uses a laser beam p			HELLWIG, W	<input type="checkbox"/>
7	CH 685108	D	199503			Reshaping articles, esp. complicated models and proto			HELLWIG, W	<input type="checkbox"/>
8	EP 593894	D	199807	11		Punching press with laser welding system - has positi			HELLWIG, J	<input type="checkbox"/>
9	US 5210910	D	199305			Bundling strap for newspapers - has flat blank with o			HELLWIG, W	<input type="checkbox"/>
10	WO 9305465	D	199303			Band gap circuit for use as voltage reference circuit			HELLWIG, W	<input type="checkbox"/>
11	EP 343661	D	199803	7		Welded stalls of punchings - made by applying laser b			HELLWIG, W	<input type="checkbox"/>
12	EP 300000	D	198808	11		High frequency stamping press operating drive - uses			HELLWIG, F	<input type="checkbox"/>
13	DE 2939461	D	198104			Error checking of read-write data in NC systems - com			HELLWIG, F	<input type="checkbox"/>
14	DE 2913999	D	198010			System programs testing for numerically controlled ma			HELLWIG, W	<input type="checkbox"/>
15	DE 2844795	D	198004			Double cable operated power grab - has conical jaw ca			HELLWIG, W	<input type="checkbox"/>
16	DE 2745101	D	197904			Gas discharge signalling device - has UV radiation em			HELLWIG, H	<input type="checkbox"/>
17	US 4146848	D	197903			Frequency stabilising system for beam-type device - i			HELLWIG, H	<input type="checkbox"/>